

Manure Storage, Handling, and Testing Information

This form must be used to submit a manure management plan to the MPCA when requesting coverage under a NPDES or SDS permit. This form should be used when manure ownership is retained. A separate form exists for instances of transferred ownership of manure.

Facility Name: _____

NPDES or SDS Permit? _____

Permit Number: _____

Owner/Operator Name: _____

Date Last Revised: _____

Registration Number: _____

Last Updated: 7/18/2015

Manure Sources	Manure Source #1	Manure Source #2	Manure Source #3	Manure Source #4
Description of Manure Source <small>Group sources with similar nutrient content if they have identical animal type, water usage, feed rations, and manure storage</small>				
Livestock Information				
Predominate Animal Type <small>(Contributing to Manure Source)</small>				
Average Animal Weight	lbs	lbs	lbs	lbs
Animal Number				
Length of Time Livestock Spend In Facility	days/yr	days/yr	days/yr	days/yr
Additional Animal Type <small>(Contributing to Manure Source)</small>				
Average Animal Weight	lbs	lbs	lbs	lbs
Animal Number				
Length of Time Livestock Spend In Facility	days/yr	days/yr	days/yr	days/yr
Storage Information				
Storage Type				
Capacity				
Storage Length				
Application Methods				
Commercial Applicator Name (If Used)				
Spreader Type				
How Volume/Tonnage Determined per Load				
How Application Rate is Calibrated				
Manure Analysis				
Sampling Frequency <small>(Annual sampling required for NPDES permits)</small>				
Sampling Methods <small>(non-agitated grab, non-agitated composite, well agitated grab, well agitated composite)</small>				
Date Last Analyzed				
Basis for N,P, & K Values Below <small>(Last Year's Sample, Average of Samples, Estimate)</small> <small>Existing sites use testing results</small>				
Total N - (do not enter lab estimated availability)	Units	Units	Units	Units
Total P₂O₅ - (do not enter lab estimated availability)	<input type="checkbox"/> lbs/ton	<input type="checkbox"/> lbs/ton	<input type="checkbox"/> lbs/ton	<input type="checkbox"/> lbs/ton
Total K₂O - (do not enter lab estimated availability)	<input type="checkbox"/> lbs/1000 gal	<input type="checkbox"/> lbs/1000 gal	<input type="checkbox"/> lbs/1000 gal	<input type="checkbox"/> lbs/1000 gal
Annual Nutrients Generated				
Total Manure Produced per Year <small>Use actual production values for existing sites</small>				

Nitrogen Management Info for Methodology Portion of MMP

Indicate below with a check mark which of the three options will be utilized to manage nitrogen applications

Option 1 - Maximum N rates derived from University of Minnesota recommendations

- A)** Based on the applicable crop rotation, manure application rates will not exceed the maximum nitrogen needs/removal of the crops derived from the following University of Minnesota Extension Service publications:
- 1) "Fertilizing Corn in Minnesota" publication "FO-3790-C, Revised 2006"
 - 2) "Fertilizer Recommendations for Agronomic Crops in Minnesota" publication "BU-06240-S, Revised 2001."
 - 3) "Nutrient Management for Commercial Fruit & Vegetable Crops in Minnesota" publication BU-05886, Revised 2005.
- B)** Manure application rates will be calculated using the following factors:
- 1) Maximum Nitrogen needs for non-legumes and nitrogen removal for legumes will follow item A) above (summarized in Table 1 below)
 - 2) Manure analysis test results (most recent or historical average)
 - 3) Soil test results (where applicable)
 - 4) First year nitrogen availability will be based on animal species and method of application as indicated in Table 2 below
 - 5) If applicable, credits for previous crops and/or manure applications will be accounted for according to item A) above and Tables 2 & 3 below
 - 6) If applicable, any fertilizer nitrogen applied will be accounted for in the calculations.
- C)** Any deviation from the maximum nitrogen applied will follow the standards allowed in Minn Rule 7020.2225, subp. 3 (A)(2) and the issued permit.

Table 1 - Summary of Max Nitrogen Recommendations

Crop to Be Grown	Yield	Crop Last Year	Crop 2 Years Ago	Max N Needs
Corn	Any	Corn	No Alfalfa	180
Corn	Any	Corn	Alfalfa	130
Corn	Any	Soybeans	No Alfalfa	140
Corn	Any	Alfalfa	Any	80
Corn Silage	Any	Corn	Corn	180
Corn Silage	Any	Corn	Alfalfa	130
Corn Silage	Any	Alfalfa	Any	80
Wheat	60 – 90 bu	Corn	No Alfalfa	110
Wheat	60 – 90 bu	Soybeans	No Alfalfa	90
Oats	81 – 100 bu	Corn	No Alfalfa	70
Oats	81 – 100 bu	Soybeans	No Alfalfa	30
Sweet Corn	8 - 9 tons	Corn	Any	120
Sweet Corn	8 - 9 tons	Soybeans	Any	90

Table 2 - First Year Nitrogen Availability*

	Broadcast Incorporation Timing			Injection	
	> 96 hours	12 - 96 hours	< 12 hours	Sweep	Knife
Beef	25%	45%	60%	60%	50%
Dairy	20%	40%	55%	55%	50%
Swine	35%	55%	75%	80%	70%
Poultry	45%	55%	70%	70%	70%

Table 3 - 2nd Year Nitrogen Availability (Carry-over)*

	Broadcast Incorporation Timing			Injection	
	> 96 hours	12 - 96 hours	< 12 hours	Sweep	Knife
Beef	25%	25%	25%	25%	25%
Dairy	25%	25%	25%	25%	25%
Swine	15%	15%	15%	15%	15%
Poultry	25%	25%	25%	25%	25%

* Values for sheep and horses are assumed to be the same as dairy

Option 2 - Neighboring state recommendations

- A)** I will use nitrogen recommendations from a land grant college in a contiguous state where the neighboring state has similar soils and climatic conditions.
- B)** I have attached the methodology and relevant publications of the neighboring state that I will be using.

Note: If you choose to use methods from another state, you need to use their entire methodology, rather than selecting only parts of the methodology.

Option 3 - Other methodology

- A)** I will use a different methodology than the above options 1 or 2 to calculate manure application rates. The maximum nitrogen application rates will not exceed those listed in the above option 1, except for allowable deviations. I am attaching the methodology I will use to calculate these application rates.

Phosphorus Management Info for Methodology Portion of MMP

Indicate below with a check mark which of the two options will be utilized to manage phosphorus applications

Phosphorus manure application rates will be managed for all manure applications according to the following :

- 1) The calculations to determine crop P₂O₅ removal rate will be based on Plant Nutrition Institute crop nutrient removal calculator found at <https://www.ipni.net/app/calculator/home>
- 2) For all animal species and all methods of application, the availability factor for phosphorus is 80 percent.
- 3) If applicable, any fertilizer P₂O₅ will be accounted for in the calculations.
- 4) When soil P test levels exceed 75 ppm Bray P1 (60 ppm Olsen) within 300 feet of an open tile intake, lake, stream, intermittent stream, drainage ditch without protective berms, or a public waters wetland, I will follow protocols listed in the issued permit.
- 5) When soil P test levels exceed 150 ppm Bray P1 (120 ppm Olsen) on any land, I will follow protocols listed in the issued permit.
- 6) Where winter-time manure application is approved, phosphorus management will follow rate restrictions listed in the issued permit.
- 7) In addition to items 1-6 I will manage Phosphorus according to one of the following options:

Option 1 Minimum Phosphorus Management Based on Minnesota Rules

When the table below indicates soil test levels indicate phosphorus management is required, I will manage the rate and frequency of manure applications to not allow soil P build-up over any 6 year period, as required in the issued permit

Option 2 Crop Phosphorus Removal Rates (over the rotation)

All manure will be applied according to phosphorus based rates, so that the rate and frequency of P₂O₅ applications will not exceed the expected crop P₂O₅ removal over the course of the crop rotation.

Table 1 - Minimum P₂O₅ Requirements

Bray P-1 (ppm)	Less than 22	22-75	76-150	Greater than 150
Olsen (ppm)	Less than 17	17-60	61-120	Greater than 120
More than 300 feet from waters*	No Phosphorus management requirements	No Phosphorus management requirements	No Phosphorus management requirements	Follow permit requirements
Less than 300 feet waters*	No Phosphorus management requirements	Prevent long-term build-up of soil P over a 6-year period (except open tile intakes)	Follow permit requirements	Follow permit requirements

* waters include: open tile lakes, streams, intermittent streams, protected wetlands, or unbermed drainage ditches

Sensitive Features Management Worksheet

Winter Application of Manure at NPDES Permitted Sites

Winter Application (frozen or snow-covered soils after December 1)

Solid Manure Applications No Winter Application of Solid Manure is Planned or Identified in the Methodology Portion of this MMP.

These practices are required for all fields that receive winter applications of **solid** manure:

- 1) No manure application within 300 feet of lakes, streams, intermittent streams, drainage ditches without berms, open tile intakes, wells, wetlands, and sinkholes
- 2) No manure application during snowmelt that creates runoff
- 3) No manure application when rainfall is likely within 24 hours
- 4) Only apply manure to areas of the field with slopes less than or equal to 6%
- 5) No manure application when ice/water completely fills furrows or depressional areas

Indicate why winter application of **solid** manure is necessary and why other alternatives are not feasible (stockpiling and/or applications during non-winter periods) **required**

- a) _____
- b) _____
- c) _____
- d) _____
- e) _____

The Minnesota Phosphorus Index must be completed for all fields for winter application of **solid** manure.

All fields must meet a low to very low relative phosphorus loss risk index level (2 or less on average).

Include a copy of the P index input and outputs to verify the result

The Minnesota Phosphorus Index can be downloaded at the following link <http://www.mnpi.umn.edu/>

Emergency Liquid Manure Applications (all sites that generate liquid manure must complete this section) No Liquid Manure is Generated at the Facility.

Winter application of **liquid** manure is prohibited by the general NPDES permit except for emergency situations (as defined by the permit)

Emergencies include land application necessary to prevent Manure storage overflows at a site designed, constructed and managed to contain Manure during the winter, and where other options for additional temporary storage are not feasible. Emergencies are considered only those situations that are beyond the control of the permittee, such as unusual weather or unavoidable equipment failure.

Identify management alternatives that will be used to prevent and minimize needed emergency **liquid** applications during the winter (check all that apply)

- Transfer manure to other liquid manure storage at the facility.
- Transfer manure to other liquid manure storage not at the facility.
- Manure storage area will be pumped in fall to maximize capacity entering the winter season.
- Only the minimum amount of manure will be applied to alleviate the emergency situation; remaining manure will be applied after spring thaw.
- Other: _____

Requirements when emergency **liquid** applications are necessary (all management alternatives identified above have been exhausted)

- 1) Call both the **Minnesota Duty Officer** (800-422-0798) and the **MPCA** within 24 hours of an emergency application
- 2) No manure application within 300 feet of lakes, streams, intermittent streams, drainage ditches without berms, open tile intakes, wells, wetlands, and sinkholes
- 3) Only apply manure to areas of the field with slopes less than or equal to 4%
- 4) Maximum application rate of 3,500 gallons/acre/winter season not to exceed 60 pounds of P2O5/acre/winter season.
- 5) Utilize an application rate that prevents ponding or runoff during the application process.

Sensitive Features Management Worksheet

This worksheet identifies all allowable techniques that can be used to provide protection to sensitive features **as required** in Minnesota Rules and/or permit conditions. One of the following measures will be employed for the applicable sensitive features. Any of the identified practices are acceptable.

Tile Intakes

- Option A - Inject or incorporate within 24 hours and prior to rainfall within 300 ft, observe a 25 ft non-manured setback, and avoid long term soil P build-up
- Option B - Inject or incorporate within 24 hours and prior to rainfall within 300 ft.
If a NPDES permitted facility 75% of the solids must settle before entering the intake.
- Option C - 35 ft grassed buffer
- Option D - 100 ft setback with at least 16.5 ft as grassed buffer
- Option E - Other: _____

Drainage Ditches

- Option A - Inject or incorporate within 24 hours and prior to rainfall within 300 ft, observe a 25 ft non-manured setback, and avoid long term soil P build-up
- Option B - 50 ft wide grassed buffer
- Option C - 100 ft setback with at least 16.5 ft as grassed buffer
- Option D - Protective Berm (prohibits runoff from entering the ditch)
- Option E - Other: _____

Lakes, Rivers, and Streams

- Option A - Inject or incorporate within 24 hours and prior to rainfall within 300 ft, observe a 25 ft non-manured setback, and avoid long term soil P build-up
- Option B - 100 ft wide grassed buffer
- Option C - 100 ft setback with at least 16.5 ft as grassed buffer
- Option D - Other: _____

Intermittent Streams and/or Public Waters Wetlands (over 10 acres)

- Option A - Inject or incorporate within 24 hours and prior to rainfall within 300 ft, observe a 25 ft non-manured setback, and avoid long term soil P build-up
- Option B - 50 ft wide grassed buffer
- Option C - 100 ft setback with at least 16.5 ft as grassed buffer
- Option D - Other: _____

Wells, Mines, or Quarry

- Option A - 50 ft setback - minimum (100 ft for NPDES Permits)

Sinkholes

- Option A - Inject or incorporate within 24 hours and prior to rainfall upslope and within 300 ft and observe a 50 ft non-manured setback (100 ft NPDES permits)
- Option B - Berm that prevents runoff from entering the sinkhole

Other Conduits to Water

- Option A - Inject or incorporate within 24 hours and prior to rainfall within 300 ft, observe a 25 ft non-manured setback, and avoid long term soil P build-up
- Option B - 50 ft wide grassed buffer
- Option C - 100 ft setback with at least 16.5 ft as grassed buffer
- Option D - Protective Berm (prohibits runoff from entering the waters)
- Option E - Other: _____

Early Fall Land Application

This only applies to facilities that have indicated manure will be applied in early fall

- Option A - Fall Application onto fields that are dominated by coarse-textured soils shall be delayed until soil temperatures in the upper six (6) inches, are less than 50 degrees Fahrenheit, unless otherwise first approved by the MPCA.

Application of Manure During the Summer Months (June, July, and August)

- Option A - A cover crop will be planted on all fields that receive manure applications during June, July, and August

Soil Erosion Conservation Measures

- | | |
|----------------------------------------------------------------------------------|------------------------------------------------|
| Option A - Establish grassed waterways | Option B - Chisel or disk tillage with residue |
| Option C - Contour stripcropping | Option D - Field edge buffers |
| Option E - No-Till cropping | Option F - Contour buffer strip |
| Option G - Terracing | Option H - Sediment control basin |
| Option I - Meet tolerable soil erosion rates ("T") as defined by NRCS | Option J - Plant a cover crop on bare ground |
| Option K - Use rotations that include other than row crops (alfalfa, grass, etc) | |
| Option L - Other: _____ | |

Sensitive Features Management Worksheet (Optional)



This worksheet identifies suggested practices that can be used to provide protection to sensitive features even though **no specific practices are required** in Minnesota Rule.

One of the following measures will be employed, when practical.

Wetlands Under 10 Acres

No specific state requirements unless a public waters wetland or other permit conditions apply.

- Option A - Observe a non-manured setback
- Option B - Maintain a grass buffer
- Option C - Incorporate manure near the wetland
- Option D - Prevent long term soil P buildup
- Option E - Utilize soil conservation practices
- Option F - Other: _____

Public Well Management Area

No specific state requirements unless other permit conditions apply.

- Option A - Observe a non-manured setback
- Option B - Follow practices recommended in city wellhead protection plan
- Option C - Soil nitrate test will be used to refine nitrogen rate management decisions
- Option D - Apply no earlier than late October or when soil temperatures are less than 50°F
- Option E - Other: _____

Shallow Bedrock

No specific state requirements unless other permit conditions apply.

- Option A - Use composted manure or other process which kill bacteria
- Option B - Maximize separation between fractured bedrock and manure
- Option C - Incorporate manure
- Option D - Other: _____

Floodplain

No specific state requirements unless other permit conditions apply.

- Option A - Avoid manure application during peak flooding periods
- Option B - Incorporate or inject manure when there is a risk of flooding
- Option C - Avoid winter-time manure applications
- Option D - Other: _____

Animal Mortality Management Worksheet



Indicate with a check mark the anticipated method of dead animal disposal.

Rendering

Carcasses at the pick-up point will comply with the following:

- Kept in an animal-proof, enclosed area.
- At least 200 yards from a neighbor's buildings.
- Picked up within 72 hours (7 days if refrigerated to less than 45 degrees).
- Other: _____

Composting

The composting area will comply with the following:

- Built on an impervious, weight-bearing pad that is large enough to allow equipment to maneuver.
Note: Class V gravel material is not considered to be impervious.
- Covered with a roof to prevent excessive moisture on the composting material, but if sawdust or other water-repelling material is used as the bulking agent, a roof may not be necessary.
- Built of rot-resistant material that is strong enough to withstand the force exerted by equipment.
- Large enough to handle each day's normal mortality through the endpoint of the composting which consists of a minimum of two (2) heat cycles.
- Other: _____

Burial

The following operational practices will be implemented

- Stay 5 feet above seasonal high water table.
- Stay 1000 feet away from lakes and 300 feet away from rivers, streams, ditches, etc.
- Be covered immediately with enough soil to keep scavengers out (three feet is sufficient).
- Not be placed in sandy or gravelly soil types.
- Maintain at least 10 feet vertical separation between dead animals and bedrock.
- Other: _____

Incineration

The incinerator will meet the following:

- Capable of producing emissions not to exceed 20 percent opacity.
- Fitted with an afterburner that maintains flue gases at 1,200 degrees Fahrenheit for at least 0.3 seconds.
- Ash from the incinerator must be handled in such a manner as to prevent particulate matter from becoming airborne.

Other Method

The following operational practices will be implemented (describe the alternative method below)
